

# AGED AWARENESS AND PERCEPTION OF CLIMATE VARIABILITY IN KANKE AND RIYOM LOCAL GOVERNMENT AREAS OF PLATEAU STATE, NIGERIA.

## ABSTRACT

This study examined aged's awareness and perception of climate variability in Riyom and Kanke LGAs of Plateau State. There was random selection of one local government area in the upper plateau (Kanke LGA) and another local government area in the lower plain of the plateau (Riyom LGA) because of the contrasting climate which is dominantly influenced by the relief in the area. The research made use of quantitative data which were obtained through structured questionnaire administered to aged male, and aged female available in the selected houses (the aged are people 60 years and over in age) in the selected rural communities of Riyom and Kanke LGAs of Plateau State, Nigeria. Where there was no combination of the two (aged men and aged women), either of the two was also sufficient. The analysis was done using SPSS. The study revealed there were more aged males than aged females. 72.7% were in the age range 60-69; more than 80% were crop farmers and about 62.6% earned less than N20,000 (56USD) per month. Also 86.3% have heard of climate change; 80.6% felt they understood climate change; while 95% felt the climatic variability was increasingly changing. The study also revealed that age and LGAs were major determinant of perception and awareness of climate change. This study therefore concluded that in order to have an effective intervention for climate change impact on the rural aged, their perception and response to climate change and also peculiarities of the areas must be taken into consideration.

**Keywords: Climate variability, Climate change, Rural aged, Perception, Awareness**

## 1.0 INTRODUCTION

Climate change is the change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer (IPCC, 2007). Climate variability is defined as variations in the mean state and other statistics of the climate on all temporal and spatial scales, beyond individual weather events (World Metreological Organisation [WMO] 2017). Climate change and variability constitute major challenges in many rural communities in Africa because of its low levels of awareness, human and financial resources and institutional and technological capabilities (IPCC, 2001). This is the case in Nigeria, since a large share of the Nigerian economy is dependent on climate-sensitive natural resources (IPCC, 2001). These challenges are even more compounded in the country because of its low capacity to adapt to climate change due to low levels of awareness, human and financial resources and institutional and technological capabilities (IPCC, 2001).

In Nigeria, women, children and the elderly are the most vulnerable to climate change (DFID, 2009) with the elderly being the most vulnerable (Okoye, 2011). These elderly people live mostly in rural areas of the country (Nigeria Bureau of Statistics, 2006). Rural communities

44 of Nigeria are increasingly populated with the very old who might be particularly susceptible to  
 45 the challenges of climate variability and change. **The aged are people 60 years and over in age.**  
 46 The aged are part of the disadvantaged populations in the rural areas and are very vulnerable to  
 47 many of the challenges due to their physical weakness, powerlessness and isolation which  
 48 continue to fortify poverty against them (Kolawole and Torimiro, 2006). In Nigeria, rural aged  
 49 may face higher levels of climate variability challenges than other rural populations and their  
 50 urban counterparts. This might be because of their level of awareness and perception of climate  
 51 variability and low social economic status. Therefore, their awareness and perception of this  
 52 variability is important.

53 Perception about climate change and variability is important in order to avoid  
 54 misconception of the situation which can be serious implications (Peters, 1997). It is important  
 55 to have a good knowledge and understanding of climate and also be able to respond  
 56 appropriately to it (Thomas *et al.*, 2007). The first prerequisite towards adaptation is a reasonable  
 57 perception of the problem (Falaki *et al.*, 2013, Gbetibouo, 2009). Falaki *et al.* (2013) opined that  
 58 one cannot adapt to climate change in an adequate way if the present and future climate change  
 59 is not perceived as a reality. Moniruzzaman (2013) also explained that by knowing the climate  
 60 literacy and wisdom of vulnerable community it is easier to take sustainable measures; policy  
 61 and action plan at national and international level.

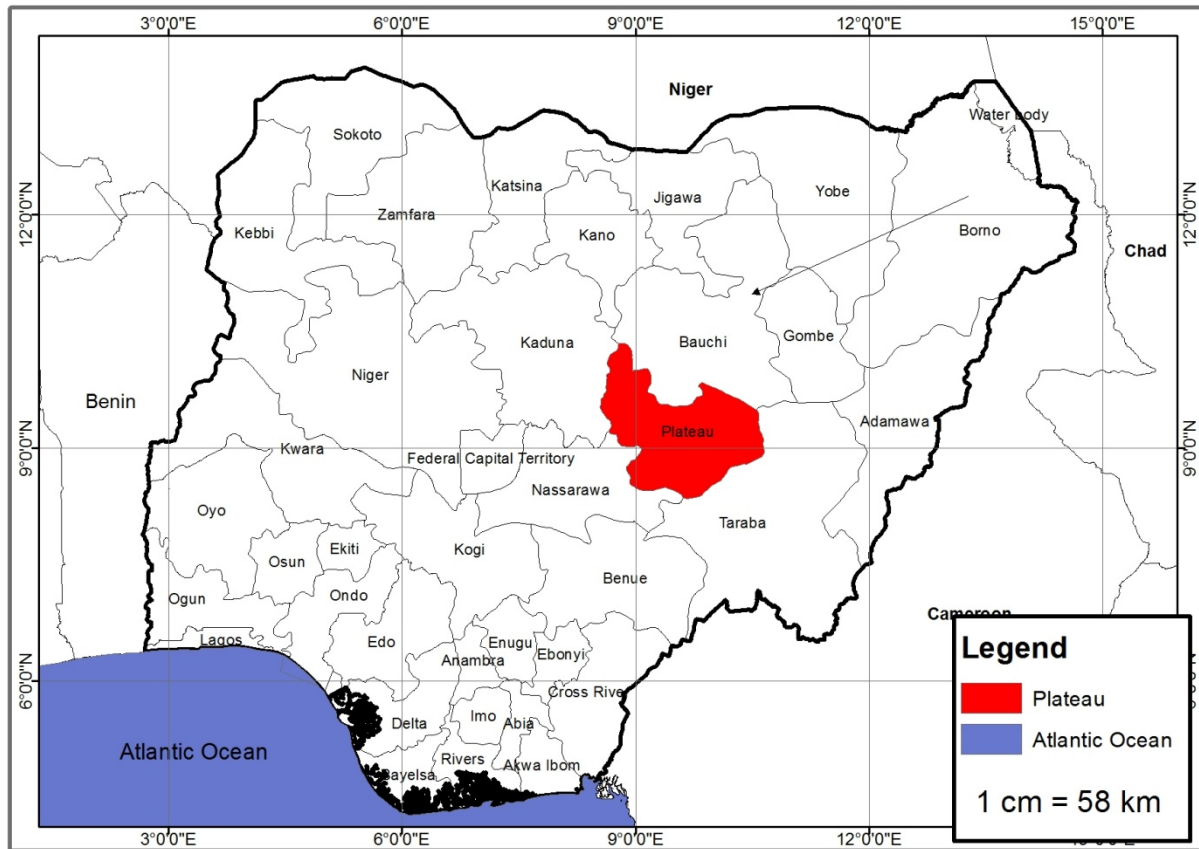
62 Issues associated with climate change and variability has generated massive attention in  
 63 research. To exemplify, scholars have analyzed climate change in terms of its **Causes** (IPCC,  
 64 2007; Karl et al, 2009; Odjugo, 2010; Bray, 2010); **Impact** (Deressa, 2007; Boko et al., 2007;  
 65 Yesuf *et al.*, 2008; Deressa, Hassen, and Ringler, 2008; Muamba and Kraybill, 2010; Jianjun *et*  
 66 *al.*, 2015); **Responses** (Deressa *et al.*, 2009; Smith and Olesen, 2010; Piya *et al.*, 2012; McNeely,  
 67 2012) and **Awareness and Perception** (Deressa et al, 2009; Tologbonse *et al.*, 2010; Sofoluwe *et*  
 68 *al.*, 2011; Mandleni and Anim, 2011; Iwuchukwu and Onyeme, 2012; Falaki, *et al.*, 2013; Amdu  
 69 *et al.*, 2013; Olajide O. Adeola, 2014; Abid *et al.*, 2015; Allahyari et al., 2016). These studies on  
 70 climate change and variability did not address the issues in relation to the situation of the rural  
 71 aged. There are dearth in studies on awareness and perception of climate variability by the rural  
 72 aged population. Therefore this study raised a need for perception and awareness of climate  
 73 change to be considered in relation to the rural aged.

## 74 **2.0 MATERIALS AND METHOD**

### 75 **2.1 Study Area**

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 77 Plateau State is situated in the central belt of Nigeria lying between latitude 8°30' and  
 78 10°30' North, longitude 7°30' and 8°37' East of the Equator.. It is bordered by Bauchi to the  
 79 North-West and Kaduna to the North East, Nasarawa to the South-West and Taraba to the South-  
 80 East (Figure 1). The state has 17 Local Government Areas: Barikin Ladi, Bassa, Bokokos, Jos  
 81 East, Jos North, Jos South, Kanam, Kanke, Langtang North, Langtang South, Mangu, Mikang,  
 82 Pankshin, Qua'an Pan, Riyom, Shendam, Wase ([www.plateaustate.gov.org](http://www.plateaustate.gov.org)) out of which Kanke  
 83 and Riyom local government areas were selected for this study (Figure 2). **The random selection**  
 84 **of one local government area in the upper plateau (Kanke LGA) and one local government area**  
 85 **in the lower plain of the plateau (Riyom LGA) was done because the upland and lower areas of**  
 86 **Plateau state has a constrasting climate which is dominantly influenced by its relief (Sanni,**  
 87 **2015).** Plateau State has an almost temperate climate. It has a mean temperature that range  
 88 between 18°C and 22°C. The state has its warmest temperature in the dry season in the months

89 of March and April and its cold season between December and February. Also the highest  
 90 rainfall is recorded in the wet season in the months of July and August. The state average annual  
 91 rainfall varies from 131.75 cm (52 in) in the Southern part to 146 cm (57 in) on the Plateau.  
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117 **Fig.1. Map of Nigeria illustrating the Study Area**

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 119 According to the 2006 census, Plateau State had a population of 3,206,531 (1,598,998  
 120 males and 1,607,533 females). Riyom LGA of Plateau State had a population of 131,778 in 2006  
 121 (NPC, 2006) and in 2016, the projected population was 172,600. Also Kanke LGA population  
 122 was 124,268 in 2006 (NPC, 2006) and 2016 projected population was 162,800. Riyom local  
 123 government area has its headquarters in Riyom town while Kanke local government area has its  
 124 headquarters in Kwal town. There are several Districts & rural communities under Riyom and  
 125 Kanke local government area. The aged in the selected rural communities of the two LGAs  
 126 (Riyom and Kanke were few in number) especially in Kanke LGA where the numbers of the  
 127 aged were extremely very few in number. **The selection of Riyom and Kanke local government**  
 128 **areas were random selection of one local government area in upper plateau (Kanke LGA) and**  
 129 **one local government area in the lower plain of Plateau State (Riyom LGA) because of the**  
 130 **contrasting climate.**

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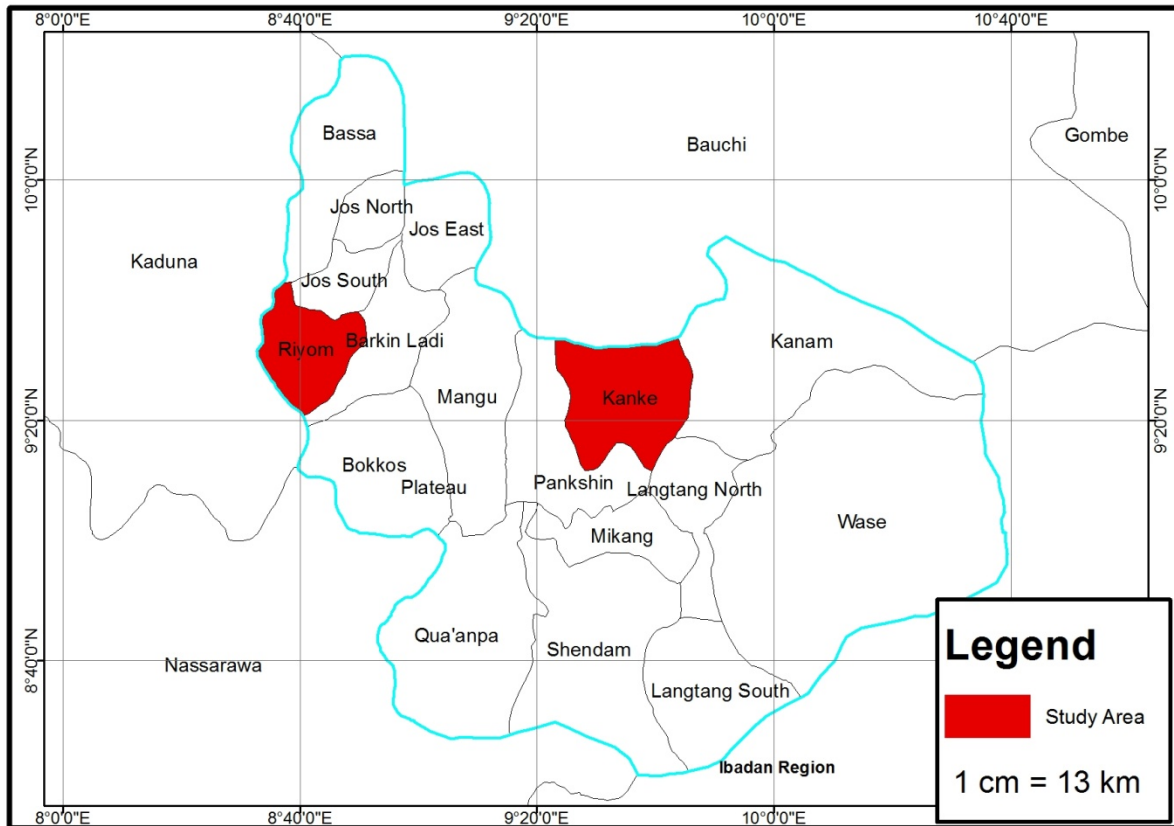
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## 2.2 Data collection

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**Fig.2. Map of Plateau State showing the Kanke and Riyom Local Government Area as the Study Area**

Quantitative primary data was obtained through structured questionnaires and distributed to an aged male and aged female (60 years and above) available in the selected rural communities of the Kanke and Riyom local government areas of Plateau State, Nigeria. Where there was no combination of aged men and aged women, either of the two was seen as sufficient.

The initial stage involved the random selection of one local government area in the upper plateau (Kanke LGA) and one local government area in the lower plain of the plateau (Riyom LGA). This was done because the upland and lower areas of Plateau state has a contrasting climate because the state is dominantly influenced by its relief (Sanni, 2015). The second stage involved the selection of three rural settlements from each of the local government areas which was done by the simple random selection process. The fourth stage is the identification of the houses where the rural aged resides. This was done using a snow ball approach in the respective settlements selected for this research. Where there was no combination of the two (aged men and aged women), either of the two was also sufficient.

Data obtained was analyzed using a number of analytic methods from SPSS package descriptive statistics (frequencies and percentages) was used to examine the socio-economic characteristics of the rural aged population. Awareness, source of awareness and perceived

176 climate variability indicators were created using the descriptive statistics (frequencies,  
 177 percentages and likert scale). Principal component analysis was used to determine the perception  
 178 index of climate variability. This was created through Principal Component Extraction estimated  
 179 from standardized indicator values. Bi-variate Correlation Analysis was used to determine  
 180 factors influencing perception of climate variability of the rural aged while Chi-Square analysis  
 181 was used to determine the factors influencing awareness of climate variability.

## 182 **3.0 RESULTS AND DISCUSSION**

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### 184 **3.1 Socio-economic characteristics of the Aged**

185 Table 1 shows the socio-economic characteristics of the aged in selected rural settlements  
 186 of Kanke and Riyom local government areas of Plateau State. The study reveals that there were  
 187 51.8% aged males and 48.2% aged females. This shows that there are more aged men than aged  
 188 females in the areas. Also majority of the respondents (72.7%) were in the age range 60-69 years  
 189 with more than 70% of the respondents married and about 26.6% widowed. The study also  
 190 showed that 64.7% had no formal education; more than 30% had either primary or secondary  
 191 education while 3.6% had post secondary education. Also, more than 80% of the respondents are  
 192 crop farmers and about 3.6% of the respondents are retired civil servants. Majority of the  
 193 respondents (62.6%) earned less than N20000 (56USD) per month.

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### 195 **3.2 Awareness of climate Variability by the Aged**

196 Table 2 revealed the analysis of the Awareness of climate Variability by the rural Aged in  
 197 Plateau State. From the table, 86.3% said they have heard of climate change/variability; 80.6%  
 198 felt they understood what is meant by climate change/variability; while 95% felt the pattern of  
 199 weather is changing; 20.9% could not recall their source of information on climate change. This  
 200 indicates that majority of the aged in the areas are aware and understand what climate variability  
 201 entails. This is in line with Falaki *et al.* (2013) and Gbetibouo (2009) who noted that reasonable  
 202 awareness of the problem is the first prerequisite towards adaptation. This will therefore enhance  
 203 their adaptation to the changing climate

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### 205 **3.3 Sources of Information on Climate Variability by the Aged**

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207 Table 3 revealed the analysis on multiple responses of sources of information on climate  
 208 variability by the rural aged in Plateau State. The table showed that the highest number of the  
 209 respondents (49.6%) got the awareness from friends and neighbors; 17.3% became aware of  
 210 climate variability from television and radio; 10.8% knew about climate change from Newspaper  
 211 and magazine while the remaining 2.8% got theirs from Internet and government agencies.  
 212 However, this contradicts Luka and Yahaya (2012) who examined sources of awareness and  
 213 perception of the effects of climate change among sesame producers in the southern agricultural  
 214 zone of Nasarawa State, Nigeria. From the study, it was discovered that the highest number of  
 215 respondents got their awareness from the educated farmers (83.3%), followed by 76.6% from the  
 216 extension agents (76.7%), 61.1% from radio and television, 52.2% from friends (Non farmers),  
 217 28.9% from nongovernmental organizations and 18.9% from newspapers. This means that  
 218 sources to channel climate change information must put into consideration avenues where the  
 219 target population can easily access the information.

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221 **Table I: Socio-economic characteristics of the Aged**

Socio-economic characteristics	Value label	Local Government Areas		Total N=139
		Kanke N= 46	Riyom N= 93	
Gender	Male	54.3%	50.5%	51.8%
	Female	45.7%	49.5%	48.2%
Age	60-64	47.8%	47.3%	47.5%
	65-69	19.6%	28.0%	25.2%
	70-74	13.0%	14.0%	13.7%
	75-79	8.7%	8.6%	8.6%
	80+	10.9%	2.2%	5.0%
Educational level	No Formal Education	60.9%	66.7%	64.7%
	Primary	21.7%	25.8%	24.5%
	Secondary	13.0%	4.3%	7.2%
	NCE/OND	2.2%	2.2%	2.2%
	HND/BSc	2.2%	0.0%	0.7%
	Postgraduate	0.0%	1.1%	0.7%
Marital status	Married or living together	71.7%	69.9%	70.5%
	Never married or Single	2.2%	2.2%	2.2%
	Widowed	23.9%	28.0%	26.6%
	Divorced	2.2%	0.0%	0.7%
Occupation	Crop production	93.5%	84.9%	87.8%
	Cattle rearing	2.2%	0.0%	0.7%
	Trading	2.2%	0.0%	0.7%
	Transportation	2.2%	7.5%	5.8%
	Others	0.0%	5.4%	3.6%
Income	< 20,000	60.9%	63.4%	62.6%
	20001-30000	19.6%	20.4%	20.1%
	30001-40000	4.3%	6.5%	5.8%
	40001-50000	15.2%	9.7%	11.5%

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223 **Table 2: Awareness of Climate Variability by the Aged**

Awareness of climate Variability Variables	Value Labels	Local Government Areas		Total N= 139
		Kanke N= 46	Riyom N= 93	
Do you understand what is meant by climate	No	13.0%	5.4%	7.9%
	Yes	69.6%	86.0%	80.6%

change/variability	Not sure	17.4%	8.6%	11.5%
Do you think the pattern of weather is changing	No	2.2%	0.0%	0.7%
	Yes	89.1%	97.8%	95.0%
	Not sure	8.7%	2.2%	4.3%
	Have you heard of climate change/variability	No	21.7%	9.7%
	Yes	78.3%	90.3%	86.3%

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**Table 3: Sources of Awareness on Climate Variability by the Aged**

Sources of Information on Climate Variability	Local Government Areas		Total N= 139
	Kanke N= 46	Riyom N= 93	
Television/Radio	2.2%	24.7%	17.3%
Friends/Neighbor/Colleagues	30.4%	59.1%	49.6%
Internet/Web	0.0%	2.2%	1.4%
Mobile phone/SMS alerts	0.0%	3.2%	2.2%
Newspapers and magazines	0.0%	16.1%	10.8%
Government Agency	0.0%	2.2%	1.4%
Cannot recall source	30.4%	16.1%	20.9%

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### 229 3.4 Perception of Climate Variability by the Aged

230 Table 4 shows Ageds' perception of climate variability. 79.1% of the aged population  
231 perceived climate variability as Flooding; this is followed by 76.3% who perceived it to be  
232 Harmattan and Haze. 73.4% felt sees climate variability to mean heavy storm. 68.3% felt its  
233 heavy rainfall, 66.2% perceived it to be delayed onset of rain; 60.4% sees it as short rainy  
234 season, 56.8% perceived it as drought, while 48.9% sees it as earlier onset of rain.

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**Table 4: Perception of Climate Variability by the Aged**

Perceived Indicators of Climate Variability	Kanke N= 46	Riyom N= 93	Total N= 139
Heavy Rainfall	12.9	55.4	68.3
Flood	29.4	59.7	79.1
Drought	12.9	43.9	56.8

higher temperature/heat	15.8	59.0	74.8
Delayed onset of rain	16.5	49.6	66.2
Earlier onset of rain	18.0	30.9	48.9
Short rainy season	13.7	46.8	60.4
Harmattan /Haze	19.4	56.8	76.3
Storm	16.5	56.8	73.4

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### 239 3.5. Creating Composite Perception Index

240 Aged's perception of climate variability indicators (heavy rainfall, flood, drought, higher  
 241 temperature and heat, delayed onset of rain, earlier onset of rain, short rainy season,  
 242 harmattan/haze and storm) were converted to Composite Perception Index using Principal  
 243 Component Analysis. The Perception Index was created through Principal Component  
 244 Extraction estimated from standardized indicator values. This standardization was performed  
 245 automatically by SPSS before running PCA. SPSS was used to generate a PCA model for the  
 246 perception index. The perception index created was also in standardized form.

247 First, the perceived indicators of climate variability were input into a PCA model to  
 248 detect their appropriateness for factor analysis. The outputs of the PCA model were four tables:  
 249 The components matrix, the common variance, communalities table and the KMO-Barlett test.  
 250 These tables were used to improve the PCA model.

251 Kaiser-Meyer-Olkin (KMO) was one of the outputs of PCA model used in the study to  
 252 detect the appropriateness of carrying out a factor analysis. The higher the KMO value, the more  
 253 appropriate to carry out the factor analysis of the variables. The KMO value for the study was  
 254 0.874 (Table 5). The value was considered very good and also within the acceptable KMO value  
 255 range. This therefore implies that factor analysis is appropriate for the study and can proceed.

**Table 5 KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.874
Bartlett's Test of Sphericity	Approx. Chi-Square	391.037
	Df	36
	Sig.	.000

256 Source: Author's Survey, 2017

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258 Another test of appropriateness of the PCA model is the size of the communalities..  
 259 Higher communalities size values means greater share of common variance explained by the  
 260 extracted components while lower size values indicate smaller share of common variance  
 261 explained by the extracted components. The value of communalities ranges between 0 and 1  
 262 Table6 Shows that the communalities size. The sizes range in value from 0.117 to 0.633. This is  
 263 considered to fall within the acceptable range.



**Table 6 Communalities**

	Initial	Extraction
Heavy rainfall	1.000	.599
Floods (Frequency and intensity)	1.000	.379
More frequent drought	1.000	.444
Excessive heat/higher temperature	1.000	.479
Delayed onset of rainfall	1.000	.587
Earlier onset of rainfall	1.000	.117
Short rainy season	1.000	.518
Harmattan haze	1.000	.245
Increase in storm intensity	1.000	.633

Extraction Method: Principal Component Analysis.

Source: Author's Survey, 2017

The correlation matrix was used to extract the factors from the PCA model (Table 7). The number of factors extracted was determined by the user using the eigen value rule in SPSS. Only factors having an Eigen value of 1.0 or more were retained. Table 7 showed that only 1 factor was revealed by this data and this accounted for 44.4% of the total variance in the data. From the table, factor loadings; heavy rainfall, flood, drought, higher temperature/heat, delayed onset of rain, short rainy season, harmattan/haze and storm revealed high positive loadings while earlier onset of rain showed negative loading.

**Table 7 Component Matrix**

	Component
	1
Increase in storm intensity	.795
Heavy rainfall	.774
Delayed onset of rainfall	.766
Short rainy season	.719
Excessive heat/higher temperature	.692
More frequent drought	.666
Floods (Frequency and intensity)	.616
Harmattan/ haze	.495
Earlier onset of rainfall	-.342

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

292 Table 8 ( total variance explained) showed two level components of PCA with Eigen values  
 293 greater 1.0 extracted using factor loading of 0.50 as the bench mark of explained common  
 294 variance).The size of an Eigen value represents the amount of variance in the PCA explained by  
 295 the component. Hence the larger the Eigen value, the more the component is explained by the  
 296 model's indicator (Henry et al, 2003). This implies that the first two components of PCA with  
 297 Eigen values greater than 1 as seen in Table 8 (total variance explained) account for high  
 298 variance while those components with eigen value of less than 1 account for less variance. The  
 299 total variance explained by the component extracted accounts for 44.4%. Also the cumulative  
 300 percentage of variance indicated 44.4%.This shows that all variance is considered to be true and  
 301 common variance.  
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**Table 8: Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.000	44.442	44.442	4.000	44.442	44.442
2	1.040	11.560	56.001			
3	.919	10.210	66.211			
4	.737	8.190	74.400			
5	.572	6.360	80.761			
6	.519	5.771	86.532			
7	.465	5.165	91.697			
8	.393	4.369	96.066			
9	.354	3.934	100.000			

Extraction Method: Principal Component Analysis.

Source: Author's Survey, 2017

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305 After assessing the appropriateness of carrying out factor analysis, the standardized  
 306 values of the component scores were saved as "perception index" a variable in the household  
 307 data using the final version of the PCA model through the Factor Analysis dialogue box in SPSS.  
 308 The perception index created was also in standardized form.  
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### 3.7. Creating Composite Awareness Index

311 Aged's awareness of climate variability indicators (heard about climate  
 312 change/variability, understand the meaning of climate variability, feel the pattern of weather is  
 313 changing) were converted to Composite Awareness Index using Principal Component Analysis.  
 314 This was created through Principal Component Extraction estimated from standardized indicator  
 315 values. This standardization was performed automatically by SPSS before running PCA. SPSS  
 316 was used to generate a PCA model for the awareness index. Indicators of climate variability  
 317 awareness were included into a PCA model to detect their appropriateness for factor analysis.  
 318 Four tables (The components matrix, the common variance, communalities table and the KMO-  
 319 Barlett test) were gotten as the outputs of the PCA model. The KMO output of the model  
 320 indicated a value of 0.463 (Table 9). This was considered too weak for factor analysis to  
 321 proceed. However other output of the model was examined.

Table 9 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.463
Bartlett's Test of Sphericity	Approx. Chi-Square	16.556
	Df	3
	Sig.	.001

322 Source: Author's Survey, 2017

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324 The communality table is another output of the model used to test the appropriateness of  
 325 factor analysis. The value of communalities ranges between 0 and 1 Table 10 revealed that the  
 326 sizes ranged in value of 0.687 to 0.894. This is considered to fall within the acceptable range  
 327 and therefore indicated the appropriateness of factor analysis and therefore can proceed.

Table 10 Communalities

	Initial	Extraction
Heard about climate change/variability	1.000	.894
Understand what is meant by climate change/variability	1.000	.687
Think the pattern of weather is changing	1.000	.766

Extraction Method: Principal Component Analysis.

328 Source: Author's Survey, 2017

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330 Table 11 showed the correlation matrix which is one of the output of PCA model. The  
 331 output was also used to detect the appropriateness of factor analysis. The Table revealed that 2  
 332 factors were extracted. Using factor loading of 0.50, the first factor loadings had 2 high positive  
 333 loadings (heard about climate change/variability and understand the meaning of climate  
 334 variability). The second factor loading also showed that 'heard about climate variability and  
 335 change' had high positive loadings and negative loading of changing pattern of weather. This  
 336 also signified that factor analysis can proceed.

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Table 11 : Component Matrix<sup>a</sup>

	Component	
	1	2
understand the meaning of climate change/variability	.828	.041
think the pattern of weather is changing	.695	-.532
Heard of climate change/variability	.390	.862

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

347 Source: Author's Survey, 2017

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Finally, Table 12 shows the total variance explained table with two level components having Eigen values greater than 1.0 extracted using factor loading of 0.50 as the bench mark of explained common variance). The first two components of the table with Eigen values greater than 1 as seen in Table 12 (total variance explained) account for high variance while those components with Eigen value of less than 1 account for less variance. The total variance explained by the first component extracted accounts for 43.99% of the total variance. The second component accounts for 34.23% of the total variance. Also the cumulative percentage of variance indicated 78.218%. This showed that all variance is considered to be true and common variance. Therefore the factor analysis can proceed.

**Table 12: Total Variance Explained**

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.320	43.991	43.991	1.320	43.991	43.991
2	1.027	34.227	78.218	1.027	34.227	78.218
3	.653	21.782	100.000			

Extraction Method: Principal Component Analysis.

Source: Author's Survey, 2017

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From the assessment of the test of appropriateness of factor analysis, all the output indicated the appropriateness of factor analysis except the KMO test which indicated otherwise because of its weak value. However, the factor analysis still proceeded. After assessing the appropriateness of carrying out factor analysis, the standardized values of the component scores were saved as "Awareness index" a variable in the household data using the final version of the PCA model through the Factor Analysis dialogue box in SPSS. The awareness index created was also in standardized form.

### 360 **3.8. Factors Influencing Aged's Perception of Climate Variability**

371 In determining factors influencing the aged population's perception of climate variability,  
372 perception of the Aged which is the dependent variable and Ageds' socio-economic  
373 characteristics which are the independent variables were correlated and presented in Table 13.  
374 Aged's perception of climate variability indicators (heavy rainfall, flood, drought, higher  
375 temperature and heat, delayed onset of rain, earlier onset of rain, short rainy season,  
376 harmattan/haze and storm) were first converted to Composite Perception Index using Principal  
377 Component Analysis. Perception Index was created through Principal Component Extraction  
378 estimated from standardized indicator values (Refer to 3.6 Section). This standardization was  
379 performed automatically by SPSS before running PCA. The perception index created was also in  
380 standardized form. Pearson and Spearman Correlation Coefficients were used to examine the  
381 relationship between aged's socio-economic characteristics and their Perceptions. Pearson  
382 correlation was used for continuous variables and spearman correlation coefficients for ordinal  
383 variables. Results in Table 13 revealed a moderate and positive association between ageds'  
384 perception of climate variability and local government areas ( $r = 0.347$ ,  $p = 0.000$ ). This implied

385 that the aged's perception of climate variability varies with the local government areas they  
 386 reside in. This might not be far-fetched from the fact that Kanke Local government area is  
 387 lowland while Riyom Local government area is upland, which according to Sanni (2015)  
 388 revealed the fact that climate of Plateau state is dominantly influenced by its relief and may  
 389 influence respondents' perception of climate variability. The result also revealed a weak negative  
 390 relationship between the respondents perception of climate variability and their Age at ( $r = -$   
 391  $0.083$ ,  $p=0.332$ ) and also a weak but positive relationship with Income at ( $r = 0.080$ ,  $p=0.347$ ).  
 392 This means, the higher the age of the aged, the lower their level of perception and the higher  
 393 their income the higher is their level of perception. However, gender, marital status, educational  
 394 status and occupation did not present a meaningful relationship. Therefore they are taken not to  
 395 be major determinant of perception of climate variability by the aged in Plateau State, Nigeria.

396 **Table 13: Correlation between Socio-Economic Characteristics and Ageds' Perception of**  
 397 **Climate Variability**

Variable 1	Variable 2	Correlation coefficient	Coefficient	P-Value	Mean	Standard Deviation
Age	Aged's perception	Pearson	-0.083	0.0332	1.99	1.192
Income	Aged's perception	Pearson	0.080w	0.347	1.66	1.018
Local Govt Area	Aged's perception	Spearman	0.347**	0.000	4.67	0.472
Gender	Aged's perception	Spearman	-0.012	0.893	1.48	0.501
Marital Status	Aged's perception	Spearman	0.007	0.938	1.58	0.909
Educational Status	Aged's perception	Spearman	-0.003	0.972	1.52	0.871
Occupation	Aged's perception	Spearman	-0.024	0.776	1.46	1.331

398 Source: Author's Field Survey, 2017

### 399 **3.9. Chi-square Table of Relationship between Socio-economic Characteristics and Ageds'** 400 **Awareness of Climate Variability**

401 Age, income, local government areas, gender, marital status, educational status and  
 402 occupation were examined to determine their influence on ageds' awareness of climate  
 403 variability. First, aged's awareness of climate variability variables (heard about climate  
 404 change/variability, understand the meaning of climate variability and thinking the parttern of  
 405 climate is changing) were first converted to Composite Awareness Index using Principal  
 406 Component Analysis. The Awareness Index was created through Principal Component  
 407 Extraction estimated from standardized indicator values (Refer to 3.7 Section). Then, chi-square  
 408 analysis was done between socioeconomic characteristics and the awareness index created.  
 409 Result of chi-square analysis is presented in Table 14. The Table revealed that there were  
 410 positive and significant relationships between awareness of climate variability index and the  
 411 listed socio-economic variables namely: Marital status ( $X^2 = 113.44$ ;  $p < 0.05$ ) and Occupation  
 412 ( $X^2 = 151.570$ ;  $p < 0.05$ ). From the analysis, it can be stated that marital status and occupation are  
 413 major determinants of the aged awareness of climate variability. However, Age ( $X^2 = 27.616$ ;  
 414  $p > 0.05$ ), Income ( $X^2 = 21.435$ ;  $p > 0.05$ ), Gender ( $X^2 = 14.847$ ;  $p > 0.05$ ), Educational Status ( $X^2$

415 =59.075;  $p>0.05$ ) and Local government Area ( $X^2=11.443$ ;  $p>0.05$ ) were found to be positive  
 416 but have no significant relationship with awareness of climate variability. This implies the ageds'  
 417 age, income, gender, educational status and local government area are not determinant of their  
 418 awareness of climate variability.

419 **Table 14: Chi-square Table of Relationship between Socio-economic Characteristics and**  
 420 **Ageds' Awareness of Climate Variability**

Variable	X <sup>2</sup>	DF	level of Significance
Age	27.616	40	0.931
Income	21.435	30	0.870
Local Govt Area	11.443	10	0.324
Gender	14.847	10	0.138
Marital Status	113.444	30	0.000
Educational Status	59.075	50	0.178
Occupation	151.570	50	0.000

421 Source: Author's Field Survey, 2017

422

### 423 Conclusion and Recommendation

424 Climate variability is perceived differently by different people and this perception is  
 425 based on their observations and experiences of rainfall and temperature patterns. Awareness and  
 426 perception of Climate variability especially by the rural aged is very important. A good  
 427 knowledge and understanding of climate change and variability will enable appropriate response  
 428 to its impact. From this study, majority of the rural aged in the region are aware of climate  
 429 change/variability and many of them got the awareness from friends, neighbours, television and  
 430 radio. The study also revealed they understood climate change/variability and felt the pattern of  
 431 weather is changing. Their understanding and perception of the reality of climate change will  
 432 help in their adaptation to the challenges of climate change

433 Result also indicated that local government area is a major determinant of the ageds'  
 434 perception of climate variability. For instance, Kanke local government area is upland while  
 435 Riyom Local government is lowland, therefore their perception of climate variability in the two  
 436 local government areas will be different due to the peculiarity of the location of the local  
 437 government areas. Therefore for effective intervention and response to climate change and  
 438 variability awareness and perception, socio-economic characteristics of the people and  
 439 peculiarities of the areas must be taken into consideration.

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